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ENTOMOLOGICAL NEWS

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Notes on Arilus cristatus (Linnaeus) in York County, Pennsylvania and on its Prey (Heteroptera: Reduviidae)

EDWIN T. MOUL, York, Pennsylvania

While collecting insects during the summers of 1943 and 1944 I have noticed an increase in the local population of the reduviid, *Arilus cristatus* (Linnaeus) commonly known as the Wheel-bug. As specimens were observed in the field, daily notes were made. An attempt was made to collect all feeding specimens with their prey. These specimens were mounted one above the other on the same pin for further study.

I have collected Wheel-bugs in York County, Pennsylvania since 1933, but only a few specimens each year. These were taken chiefly in the wooded areas of the Susquehanna river hills and the Conewago Creek. They were rare enough for me to collect each specimen seen. I have one specimen for 1933, 2 for 1934 and 2 for 1938.

In 1942 these insects first appeared in gardens in central York County, frequently enough to have my attention called to them by neighbors and interested citizens. I have a specimen taken on August 22, 1942 which was feeding on a Japanese beetle (*Popillia japonica* Newn.).

Egg masses were common during the winters of 1943 and 1944. Hexagonal clusters of from 75 to 150 eggs were found on trunks of white pines, branches of apple trees, one on the branch of a quince tree, one on the trunk of a chestnut oak, several on the undersurfaces of cherry limbs and on sides of grape vines. Most of these egg masses were within four (4) feet of

the ground, but placed with no apparent regard to protection or cover.

Nymphs were first collected, with prey, on June 3rd. The last adults were collected on October 11th. Leland O. Howard reports the young nymphs as feeding on soft-bodied insects, "such weak, delicate species as plant lice." While some young nymphs were observed feeding on young tent caterpillars, others collected while feeding, had on their beaks the Locust-leaf-mining beetle (*Chalepus dorsalis* Thunb.) and a leaf-bug (Miridae). Several third instar nymphs were observed feeding on a pentatomid nymph, an adult Pentatomid (*Euschistus euschistoides* Vollenhaven) and an adult Membracid (*Ceresa diceros* Say.); one fourth instar nymph was taken with a pentatomid nymph. Last instar nymphs were taken with an adult pentatomid (*Euschistus variolarius* Beauv.) and Japanese beetles (*Popillia japonica* Newn.); adult Wheel-bugs with Japanese beetles, caterpillars and a wasp (Eumeninae).

A complete list of prey follows:

Hemiptera
Miridae—1
Tingidae—1
Pentatomidae
Nymphs—2
Adults—2

Homoptera
Atymnus querci Fitch—1
Ceresa diceros Say—1

Arachnids
Spider—1

Coleoptera
Chalepus dorsalis Thunb.—3
Elateridae—1
Weevil—1
Popillia japonica Newn.—13

Lepidoptera
Tent caterpillar—3
Caterpillars—3

Hymenoptera
Eumeninae (wasp)—1

Copulating adults were taken on August 23rd, and August 29th.

The question arises, has this unusual increase in this predatory species been due to an increased food supply during the growing season? From observation, the increase of *Arilus*

cristatus (Linnaeus) has paralleled the local infestation of *Chalepus dorsalis* Thunb. and *Popillia japonica* Newn. Mr. Guy Boyd, a local insect exterminator, has also observed these Wheel-bugs preying on Japanese beetles consistently and concurs with me in the opinion that their abundance is due to this increased food supply. These two beetles have been the predominant forms taken for food. More evidence is needed and the above report is submitted with the hope that further information will be forthcoming.

Notes on the Odonata of Delaware County, Pennsylvania

JOHN GILLESPIE, Glenolden, Pennsylvania

During the five years that I have been studying dragonflies, most of my collecting has been done in the Delaware County region, the majority of it at ponds and streams within four or five miles of Glenolden. A number of interesting captures have been made during this five-year period, which, in the case of a few species, have established extensions of their known ranges.

Many Delaware County records are mentioned in Dr. P. P. Calvert's Catalogue of the Odonata of Philadelphia, of 1893. None of these records, or more recently published ones by Dr. Calvert are given here, except for the mention of four interesting species not in the list below. These are *Erythrodiplax berenice, Sympetrum corruptum,* and *Argia tibialis* (Calvert, Cat. Odon. Phila.), and *Cordulegaster diastatops* (Calvert, Ent. News XLIX: 251, 1938). There are, however, a number of unpublished records that Dr. Calvert has kindly given me, some of which are included here in order to make the data as complete as possible. Our combined notes bring the number of species reported in Delaware County to eighty-three. This shows that a small and thickly populated district like Delaware County can still yield an interesting variety of dragonflies.

Only some of the less common species, for which previously published records from the Philadelphia area are either very

meager, or lacking entirely, are mentioned in this paper. Those marked with an asterisk (*) have not been previously reported from Delaware County or Philadelphia. A double asterisk (**) indicates new Pennsylvania records, but it is very likely that some of these species occur commonly in some part of the state, and have been overlooked because of the wide gaps in our knowledge of Pennsylvania Odonata. Two species which have been taken just outside of the county are included for the sake of completeness.

The collecting area at Holmes deserves special mention. It consists of several swampy ponds with a total area of about an acre. The swamp is apparently produced by springs, and at the end of a very dry summer, as in 1943, it may almost dry up. In spite of this semi-temporary condition the swamp always swarms with dragonflies throughout the summer. Forty-five species have been taken or observed there as a result of some twenty odd collecting trips during the last four years. Many of these species are of particular interest, and Holmes is mentioned frequently in the list of species which follows.

Hagenius brevistylus Selys. Cheyney, June 17, 1934, 1 ♀ (P. P. Calvert). One female in a field near a small brook flowing into the Springfield Reservoir, June 25, 1940.

Gomphus plagiatus Selys. Ridley Twp., Aug. 30, 1894, 1 ♀ (P. P. Calvert).

G. spiniceps Walsh. Chester Creek, Glen Riddle, July 16, 1908, 1 ♂ and 1 ♀ just transformed, their exuviae, two other exuviae (A. S. Calvert, coll. P. P. Calvert). Crum Creek above Strathaven, July 28, 1908, 1 ♀ dead in water, 27 exuviae collected along banks, other exuviae seen (P. P. Calvert).

G. lividus Selys. Common along the Munckinipattus Creek. Several records for Chester, Ridley, and Crum Creeks (May 10–June 21).

Lanthus albistylus Hagen. Castle Rock, June 16, 1901, 1 ♀ (Daecke, det. by P. P. Calvert).

Gomphaeschna antilope (Hagen). A female was clinging to the outside of the screen on my window at 7:30 A.M., May 22,

1941. Another female was taken on a screen door the following year, early in July. On several dates during a two-week period before the May 22 female was taken, a small aeschnid with a bluish abdomen was seen flying and hovering in sunny parts of the Munckinipattus Creek, low over the water. It was very likely a male of this species, but repeated efforts to catch it were in vain.

**Basiaeschna janata* Say. Sycamore Mills, Ridley Creek, May 14, 1942, 1 ♂. Several others seen there and on Chester creek on the same date.

Anax longipes Hagen. Cheyney, Smithson's Pond, July 9, 1936, 1 ♀ dead, decomposing on water's surface (P. P. Calvert). Holmes, June 19, 1941, 1 ♂. (Sight record.) It captured a small dragonfly (*Sympetrum* or *Pachydiplax*), and spent at least ten minutes devouring it while at rest in a tree. On another occasion, on Marthas Vineyard, Massachusetts, I saw this species capture a smaller dragonfly. *Longipes* seems to be more voracious than its much commoner relative, *junius*.

***Aeshna constricta Say.* A male was netted in our garden, Sept. 19, 1943. Two males taken in a large field, about half a mile from the edge of Tinicum marshes. After flying about, low over the ground, they lit on grass stalks, just a few inches from the ground. Sept. 26, 1943. Two males captured while flying slowly, very near the ground in a wide grassy lane at the edge of Tinicum marshes. Sept. 29, 1944. Except for a male that I took at Cape May, N. J., Sept. 25, 1944, this seems to be the southernmost record for this species.

Ae. tuberculifera Walker. Holmes, Sept. 1, 1941, 1 ♂ One male taken in large field, as above, Sept. 26, 1943. On this date the three species of *Aeshna* mentioned here, plus *umbrosa,* were collected in about twenty minutes time, and within a hundred-yard stretch along the edge of the field. Moore Lake, Sept. 12, 1944, 1 ♂.

Ae. verticalis Hagen. Holmes, Sept. 12, 1941, 1 ♀. One male taken in large field, as above. It first lit on my shirt, then flew off and lit on shrubbery, six feet from the ground. Sept. 26, 1943. One female in the garden, Sept. 20, 1944.

Glenolden Park, Oct. 2, 1944, 2 ♂. Flying and hovering over two of the small ponds there. Another male seen over a pond. Probably this species (1 ♂) at Holmes, Oct. 10, 1944.

Cordulegaster erroneus Hagen. Smedley Park, Media, Aug. 20, 1942, 1 ♂. Flying slowly along a tiny brook which trickled down a steep, heavily wooded hillside.

Macromia illinoiensis Walsh. Castle Rock, July 22, 1900, one nymphal exuvia (P. P. Calvert).

Didymops transversa (Say). Crum Creek above Strathaven, July 28, 1908, one exuvia on bank (P. P. Calvert). Chester Creek, May 14, 1942, 3 ♂; Sycamore Mills, Ridley Creek, same date, 1 ♂.

Epicordulia princeps Hagen. Westtown Lake, Chester County, July 2, 1941, 1 exuvia 1½ feet above water on a reed. One male flying over the lake on July 24 and 26, 1941.

Somatochlora tenebrosa (Say). Glenolden, Sept. 2, 1940, 1 ♀. Single individuals seen on a few occasions flying in somewhat shaded clearings in Glenolden during the latter part of August for the three following years.

***Celithemis martha* Williamson. Holmes, Aug. 2, 1941, 2 ♂.

***Erythrodiplax connata minuscula* (Rambur). Holmes, Aug. 11, 1943, 1 ♂. It was surprisingly wary. Lit mostly near or on the ground. This is the northernmost record for this species.

**Ladona julia* (Uhler). Ridley Lake, July 1, 1944, 1 ♂. It was flying swiftly, far out over the water, close to the surface, quite un-Libellula like, and quite different from my observations of it in New Jersey.

***Libellula auripennis* Burmeister. Field near Tinicum marshes, July 7, 1940, 1 ♀.

***L. flavida* Rambur. Cheyney, Smithson's pond, July 20, 1933, 1 ♂ (P. P. Calvert). Cheyney, June 28, 1941, 1 ♀.

**L. incesta* Hagen. Several individuals at Ridley Lake, July 29, 1940, and at Holmes, July 10, 1941.

L. vibrans Fabricius. Munckinipattus Creek, Aug. 10 and 11, 1942, 2 ♂. Several of both sexes along and near the same

creek, Aug. 6, 14, and 17, 1943. Crum Creek, Aug. 20, 1942, 2 ♂.

****Sympetrum ambiguum** Rambur. Seen only in 1944. About a dozen specimens taken and seen near the Munckinipattus Creek, Aug. 12 to 25. Most of them were along a swampy ditch in rather deep woods. Holmes, Aug. 15, 5 ♂. They kept exclusively in the shade of small willows. One male at edge of Tinicum marshes, Aug. 25. Crum Creek, Sept. 5, 1 ♂.

***S. obtrusum** Hagen. Folsom, Sept. 17, 1897, 1 ♂ (P. P. Calvert). Pond in Glenolden, Sept. 12, 1943, 1 ♂. Holmes, Aug. 15, 1944, 2 ♂. Pair taken at edge of Tinicum marshes, Aug. 25.

***Leucorrhinia frigida** Hagen. Holmes, July 3, 1944, 1 ♂. In company with *intacta*. This is the southernmost record.

Pantala hymenaea (Say). Cheyney, Smithson's Pond, Aug. 28, 1937, one recently transformed (P. P. Calvert). Sight records: Holmes, July 9 and 10, 1941; Glenolden, Aug. 10, 1943.

Lestes eurinus Say. Holmes and a small pond one mile west of Rose Valley, June 19, 1941, 2 ♂. Holmes, July 10, 1941, 1 ♀. Holmes, July 3, 1944, 1 ♂ taken, several others seen.

***L. congener** Hagen. Glenolden, Aug. 12, 1944, 1 ♀. Along a path in the woods, near the Munckinipattus Creek.

***L. unguiculatus** Hagen. Cheyney, Smithson's Pond, Sept. 27, 1935, fairly abundant (P. P. Calvert). Holmes, Aug. 11 and Sept. 4, 1943; July 3 and Aug. 15, 1944, quite common. Pond in Glenolden Park, Aug. 22, 1944, several males.

***L. vigilax** Hagen. Pond in Glenolden, Aug. 15, 1942, 1 ♂. Holmes, Aug. 11, 1943, 1 ♀.

Argia moesta (Hagen). Aston Mills, Chester Creek, June 25, 1940, 1 ♂.

A. sedula (Hagen). Beaver Valley, along the Brandywine Creek, Delaware, Sept. 4, 1944, 1 ♂. The exact locality where this specimen was taken is just a small fraction of a mile from the Delaware County border.

***A. translata** Hagen. Chester Creek at Glen Riddle, July 16, 1908, 3 ♂ on rocks in mid-stream (P.P. Calvert).

Nehallenia irene Hagen. Glenolden, near the Munckinipat-

tus Creek, July 2, 1944, 2 ♂. Holmes, July 3, a small number present. Pond at Addingham, July 18, 1940, 2 ♂.

**Chromagrion conditum* (Hagen). Aston Mills, Chester Creek, June 25, 1940, 2 ♂, 1 ♀. Holmes, May 29, 1941, 1 ♀. Cheyney, June 3, 10, 17, 1934 (P.P. Calvert).

Enallagma divagans Selys. Observed along the Munckinipattus and Crum Creeks in small numbers in the early part of summer. Probably occurs on other streams also.

**E. hageni* Walsh. Holmes, July 3, 1944, 1 ♂.

***E. cyathigerum* (Charpentier). Small pond one mile west of Rose Valley, June 19, 1941, 1 ♂. Just one male and one female were seen, most of the time paired. The pair were amazingly active and wary. *E. aspersum* was quite tame and could be taken by the netful here, but nearly an hour was spent trying to capture *cyathigerum*.

**E. geminatum* Kellicott. At various ponds and lakes, but nowhere common.

***E. traviatum* Selys. Moore Lake, July 10, 1940, 1 ♂. Ridley Lake, July 1, 1944, 1 ♂, 1 ♀ (pair). Several others seen.

Ischnura ramburii Selys. Moderately common at Ridley Lake, 1943 and 1944. A small number at Holmes, Aug. 15, 1944.

Anomalagrion hastatum (Say). Rather numerous at Holmes. A pair taken in the garden, Oct. 16, 1943. Cheyney, Smithson's Pond, a number of records by Dr. Calvert.

The Feeding Habits of Uranotaenia lowii Theobald (Diptera: Culicidae)

(*Continued from page 37*)

CHARLES REMINGTON, Medical Department,

Army of the United States

Bufo woodhousii fowleri (Hinckley). Fowler's Toad was only slightly less common than *B. valliceps*. In the several comparative biting tests conducted, *U. lowii* fed as readily on

B. w. fowleri as on *B. valliceps*. The mosquitoes attacked the hind femoral and caudal area of both toads.

Desmognathus fuscus auriculatus (Holbrook). The southern Dusky Salamander was the only species of Caudata found in the field during this study, and the single specimen was hidden in the remains of a rotten log. Although the secretive habits of the salamander may keep it out of reach of the mosquitoes usually, the results of the biting test are of interest.

The salamander was placed in the cage and ten *U. lowii* were released therein. For many minutes the salamander was very active. *U. lowii* quickly found it and endeavored to bite, but just as feeding began the creature always moved rapidly away, and mosquitoes trying to bite were roughly thrown aside. The salamander showed a distinct reaction to the bites. It appeared from these few observations that, of the several types of amphibians attacked by the mosquitoes, only the salamander showed this reaction when bitten.[3] The *U. lowii* persisted in trying to feed on the salamander, and within 15 minutes after it became quiet, four *lowii* had fed to repletion and staggered away. Five had begun tapping the skin and probably would have fed soon. The remaining mosquito was injured during the first thrashings, when it had tried to bite the salamander, and it soon died. All feeding on the salamander was from the tail.

Invertebrate animals. While the first biting tests were being conducted, a few attempts were made to explain the source of the pale fluid found in so many wild-caught *lowii*. One possibility was the blood of invertebrate animals. This seemed unlikely in the light of the known hosts of other mosquitoes, most of which are vertebrate animals.[4] A few common soft-skinned

[3] The above observations are meager, and it would be desirable to carry on experiments adequate to prove whether salamanders in general are actually disturbed by the bites and whether toads and frogs are not generally affected. It should be determined whether the latter have built up a resistance to the saliva. Burrowing toads may be found to react more like salamanders than like toads.

[4] Edwards (1941) describes the amazing habits of members of the mosquito genus *Harpagomyia* deMeij., considered a relative of *Uranotaenia*. These tiny day-flying mosquitoes found in Africa and Asia feed

invertebrates were tested, nevertheless. In three tests, in each of which twenty *U. lowii* were used, the mosquitoes declined even to approach, respectively, several large earthworms, a large terrestrial snail which was moving about freely, and two large land slugs. The lack of mosquito response in each of three tests increased the doubt that invertebrates are attacked, and in all further tests vertebrate animals were used.

Applications of Findings

In considering the results of the above studies, certain applications appear. First, *Uranotaenia* should be investigated as of possible significance in the development and transmission of blood parasites found in reptiles and amphibians. The sporozoan blood parasites of the family Haemogregarinidae are known to have stages in a vertebrate and an invertebrate host, much like the malaria parasite, *Plasmodium*. Members of *Haemogregarina* Danilewsky are common in amphibian and reptile blood. One species, *H. stepanowi* D., is known to undergo schizogony in a turtle and sexual reproduction in a leech which attacks the turtle. Another haemogregarine, *Karyolysus lacertarum* D. has asexual stages in a lizard and sexual reproduction in the digestive system of a mite. Invertebrate hosts of most species of haemogregarines are, however, unknown as yet.

Second, *Uranotaenia* can be utilized in studying the mechanics of mosquito mouthparts in action. *Aedes aegypti* (L.) was used by Gordon and Lumsden (1939). These authors examined the mouthparts of biting mosquitoes through the thin web of the foot of a frog. However, *A. aegypti* does not normally attack amphibians, and some difficulty was experienced in inducing it to bite the frog web. *Uranotaenia* may prove to be a more suitable subject.

by thrusting the proboscis between the mandibles of an ant and imbibing the fluid presented by the ant, which gives "an alms to the beggar, passing on a moment or two later just as if it had met a friend."

SUMMARY

1. Published information on the feeding habits of members of the mosquito genus *Uranotaenia* is sparse. Observations of the biting of these mosquitoes are indefinite and questionable, the few remarks merely indicating that certain species probably do not bite man. Precipitin tests are said to have revealed chicken blood in an African species.

2. *Uranotaenia lowii,* while feeding, frequently rests beside the host, rather than upon it. The parts of the body of the host from which feeding is done are usually those farthest from the head, i.e., the tail, hind legs, and lower back. Since the hosts are insectivorous, the mosquito contributes to its self-preservation, intentionally or not, by thus avoiding the head. In the limited observations of a few species, no toads or frogs showed a reaction to the bites, but a single salamander tested was clearly disturbed.

3. Abdomens of most wild-caught females contained a pale fluid. When a meal was taken in the laboratory, blood was ingested until the pale juice had been forced from the abdomen by the blood being drawn from the host. It has long been known that both male and female mosquitoes feed on plant juices, and they have been kept in the laboratory for long periods of time, fed on raisins and various vegetable fluids. However, I find no records of the observation of the replacing of these juices by blood.[5]

4. The readily accepted hosts of *U. lowii* are amphibians. *Bufo valliceps, B. woodhousii fowleri, Rena sphenocephala, Hyla c. cinerea,* and *Desmognathus fuscus auriculatus* were all attacked by *U. lowii.*

It is doubted that reptiles are hosts of *lowii. Terrapene carolina, Anolis carolinensis,* and *Leiolopisma laterale* were all of no perceptible interest to *U. lowii.*

Invertebrates probably are not hosts of the *Uranotaenia.*

[5] A single drop of fluid is often excreted by an engorged mosquito immediately before the proboscis is withdrawn from the man being bitten, and it has been designated "intestinal fluid" in various writings.

Earthworms and shelled and shell-less terrestrial Gastropoda were not attacked when exposed to *U. lowii.*

In a single test, *lowii* refused to bite man. In the light of the findings of Davis and Philip (1931) in Africa, it is regretted that no birds were tested.

5. Among the possible applications of the results of these studies are: 1) investigation of *Uranotaenia* as a vector of blood parasites of amphibians; 2) use of *Uranotaenia* for studies of mosquito mouthparts in action.

References

Barraud, Philip James, 1934. The Fauna of British India including Ceylon and Burma. Diptera, V. Family Culicidae, Tribes Megarhini and Culicini. Taylor & Francis. London.

Davis, G. E. and Philip, C. B., 1931. The Identification of the Blood-meal in West African Mosquitoes by means of the Precipitin Test. A Preliminary Report. *Amer. Journ. Hyg.* XIV, pp. 130–141.

Dyar, Harrison, G., 1922. The Mosquitoes of the United States. *U. S. Natl. Mus. Proc.* LXII, art. 1, 119 pp.

——, 1928. The Mosquitoes of the Americas. *Carnegie Inst. Wash. Pub.* 387.

Edwards, F. W., 1941. Mosquitoes of the Ethiopian Region, III. Culicine adults and pupae. Adlard & Son, Ltd., London.

Gordon, R. M. and Lumsden, W. H. R., 1939. A Study of the Behaviour of the Mouthparts of Mosquitoes when Taking up Blood from Living Tissue; Together with some Observations on the Ingestion of Microfilariae. *Ann. Trop. Med.* and *Parasit.* XXXIII, pp. 259–278.

Headlee, Thomas J., 1921. The Mosquitoes of New Jersey and their Control. *N. J. Agr. Exp. Sta. Bull.* 348.

Hinman, E. Harold, 1935. Biological Notes on *Uranotaenia* spp. in Louisiana (Culicidae, Diptera). *Ent. Soc. Am. Ann.* XXVIII, pp. 404–407.

King, W. V., Bradley, G. H., and McNeel, T. E., 1939 (rev. 1944). The Mosquitoes of the Southeastern States. *U. S. Dept. Agr. Misc. Publ.* 336.

Rozeboom, L. E., 1942. The Mosquitoes of Oklahoma. *Oklahoma Agr. Exp. Sta. Tech. Bull.* No. T–16.

Theobald, F., 1903. A Monograph of the Culicidae of the World. Vol. 3. British Museum of Natural History.

The Wasmann Collection of Ants

By PHIL RAU, Kirkwood, Missouri

Occasionally, one runs across articles in the daily press and in the weekly magazines that are of sufficient importance to deserve a permanent place in a scientific journal. An item of entomological interest recently appeared in the weekly magazine "Time" (Nov. 20, 1944, p. 88), in reference to the whereabouts of the remarkable collection of ants made by the famous student, Erich Wasmann.

The war-correspondent, Lewis Gannett, himself an amateur formicologist, reports to his paper that the Wasmann collection, formerly at Maastricht in Holland, was forcibly removed to Berlin by a certain Dr. Bischoff, curator of the Zoological Museum at the University of Berlin.

The article goes on to say that the collection was the work of the late Jesuit Father, Erich Wasmann, who was known as the "Fabre of the Ants." He had gathered specimens of most of the 3500 species of ants, and when he died in 1931, he left his collection to another Jesuit entomologist, Father Schmitz, who added to it his own collection of phorid flies. In October, 1942, on the demand of Dr. Bischoff, the collections of ants and phorid flies were given up, "the professor carrying them off to Berlin after ostentatiously signing a receipt." *

As for Father Schmitz, when last heard from he was in the Tyrol "collecting phorid flies, and had already collected 1000 (*sic*) species."

The professor mentioned is evidently none other than the noted Dr. H. Bischoff of the University of Berlin, author of the 600-page book "Biologie der Hymenopteren" (1927), which by the way is the best and most complete work on the biology of hymenopterous insects in existence. In spite of this episode, I for one will never be able to picture him as anything other than a mild-mannered man.

* Incidentally, as if one atrocity is not enough, the editors of the magazine captioned the article "The Rape of the Ants."

Notes on Some Microlepidoptera

By Emlen P. Darlington, New Lisbon, Burlington County, New Jersey

The observations herein presented serve to amplify what has already been recorded and call attention to observational differences. As larval habits often vary under artificial conditions, rearing records have been carefully checked against field observations in an endeavor to eliminate assumptions as much as possible. Except when stated to the contrary, all notes refer to records and observations made in vicinity of New Lisbon, New Jersey.

The references given are those that seem most pertinent to the text, irrespective of their sequence.

Reared material of all species cited is in the collection of the Academy of Natural Sciences, Philadelphia.

Olethreutidae

Polychrosis liriodendrana Kearfott and *Polychrosis magnoliana* Kearfott

Lectotypes in the Am. Mus. Nat. Hist.

Heinrich says, "I have examined the types of Kearfotts' two species carefully and can see no real difference between them, genitalic or otherwise." A series reared from both food plants failed to reveal any larval differences and it might be possible by pinning leaves back to back to transfer from one food plant to the other; I have transferred them thus on magnolia. At New Lisbon, N. J., the species is common on magnolia in certain localities but was not observed on *Liriodendron tulipefera* until the fall of 1943 when it was abundant. In 1944 none could be found on these same trees.

Starting near the base on the under side of a leaf the larva feeds upward and outward, covering the area with a fine tenacious web, under which, along the midrib, is a fine silken tube into which the larva retreats when disturbed. The midrib is often tunneled for a short distance causing it to turn brown. On *Liriodendron* a lateral rib may also be tunneled, and larvae

were found feeding in an unusual manner between two leaves webbed flatly together. Mature larvae measure 11 mm. and have a bluish cast in reflected light, due to the contents of the gut tract. Immature larvae are greenish. Caged larvae will pupate under an oval flap 12 to 13 mm. across, cut and hinged from the edge of a leaf and tightly fastened to cover a naked pupa; they also pupated in the trash at the bottom of the cage, naked or encased. Normally pupation is not on a leaf; I have examined hundreds of magnolia leaves upon which *P. liriodendrana* have fed and never found a pupa on a leaf; also I examined every leaf from a small but heavily infested tulip poplar and found no attempt at pupation on the leaves nor any pupa on the ground, the assumption being that the larvae crawled away to where some debris had accumulated.

Moths released in a cage over a magnolia shoot would not oviposit but those released unrestricted oviposited on leaves close to the ground, with larval work noticeable July 5th. Both mature and young larvae can be found in the open on *Magnolia virginiana* by July 20th.

Regarding a spring brood recorded by Kearfott as feeding on the flowers, I can find no substantiating evidence, my belief being that they feed only on leaves near the ground. I have seen magnolia shoots with every leaf harboring a larva, without evidence of work on overhanging branches. Moths emerged from reared pupae May 28 to June 15, which is late for tulip poplar flowers and I have never found them in magnolia flowers; besides, "Rose chafers" and other *coleoptera* that frequent the flowers would make life impossible for *P. liriodendrana.*

Kearfott, Trans. Am. Ent. Soc., XXX, 1904, p. 293; Trans. Am. Ent. Soc., XXXIII, 1907, p. 6.
Heinrich, U. S. N. M. Bull. 132, 1926, p. 89.

Endothenia hebesana Walker and *Endothenia daeckeana* Kearfott

After examining considerable reared material the question arises, are they different species or only food variants. They

are general feeders in the seed capsules of various plants and differ in size and coloration depending upon the amount of food available, but in all material examined the maculatory pattern was the same. They are abundant on cultivated iris and the imagos differ in no way from those reared on pitcher plant (*Sarracenia purpurea*), and described by Kearfott as *daeckeana;* while those reared from *Baptisia tinctoria* varied only in averaging a little smaller. Two reared from blackberry lily (*Gemminia chinensis*) approximate more closely those labeled *hebesana* in collections.

A large series reared from pine barren gentian (*Gentiana porphyrio*) average a little smaller than those reared from *Sarracenia,* and are lighter in color, with less black and more tan and less blue in the fascia. They seem to represent Walker's *hebesana.*

Walker, Cat. Lep. Heter. Brit. Mus., XXVIII, 1863, p. 342.
Kearfott, Trans. Am. Ent. Soc., XXXIII, 1907, p. 12.
Heinrich, U. S. N. M. Bull. 132, 1926, p. 103, 104.
Forbes, Memoir 68, Cornell Univ. Agr. Exp. Sta., 1924, p. 458.

Exartema sericoranum Walsingham

The food plant is recorded as *Myrica* and I have reared it on *M. carolinensis,* webbing the tips, pupating between leaves or in dead leaves at bottom of cage. *Imagos* July 1 to 7. I have also reared it on *Leucothoe racemosa,* and while the pattern is the same it differs from the typical *sericoranum* in that the interrupted fascia is brick-red instead of rust-orange and is definitely outlined with black; there is also a deeper purple in the stria separating the brick-red areas. Larvae and pupae in rolled leaves. Imagos July 1 to 7.

Evidently there are food variations in this genus that might be confusing.

Forbes, Memoir 68, Cornell Univ. Agr. Exp. Sta., 1923, p. 466.
Heinrich, U. S. N. M. Bull. 132, 1926, p. 152.

Gypsonoma fasciolana Clemens

A spectacular species of 16 mm. expansion, with a black basal

patch, followed in fresh specimens by a purple-white fascia, then an irregular black fascia and another purple-white fascia less clearly defined. Tip and adjacent cilia black. No food plant heretofore recorded. I have reared it on *Comptonia asplenifolia;* in webbed tips. Imagos June 1.

Heinrich, U. S. N. M. Bull. 123, 1923, p. 163.

Gwendolina concitatricana Heinrich

Two specimens, determined by Heinrich as this species, were reared on black walnut (*Juglans nigra*). Imagos, June 28.

Heinrich, U. S. N. M. Bull. 123, 1923, p. 189.

Anchylopera platana Clemens

Very common where the sycamore grows. The larva draws the leaf into a pucker along a rib on the under side by means of a stout web. It hibernates during the winter outside of the feeding area, in a turned-over edge of a leaf, or in a crumpled old leaf, without much protection. Imagos, June 1 to 13, and can be taken on the wing all summer.

Ancylis comptana Frohlick and *Ancylis floridana* Zeller, Differentiated

Heinrich says there are no genitalic differences in the synonymized species. J. B. Smith gives the first complete life history of *A. comptana;* complete except as to how the winter is spent. The larva does not pupate in the fall as originally supposed but remains dormant in a curled or rolled edge of a dried leaf until nearly spring.

A. floridana is described by Zeller as a distinct species and no doubt should remain so; it feeds on Uva-ursi or bearberry and I have not been able to induce the moth to oviposit on strawberry. In a normal season moths are on the wing at Whitesbog, Burlington Co., N. J., by April 20, at which time pupa and overwintering larvae can both be found in the old dead leaf tips. The moth deposits an egg on or near the tip of a young imbricated shoot and the larva bores its way into the developing tip.

Young larvae can be found on or before May 15th. Imagos by June 1st. Pupation is in the dead tip of the feeding area killed by the larva, generally in a loose web on the under side of a leaf, and if not protected by a closely pressed adjacent leaf the pupal leaf will be slightly curled. There are over-lapping broods until autumn, the last wintering as dormant larvae in the dead tips, going down the stem on warm days to feed openly on the evergreen leaves; this, if nothing else, will distinguish it from *A. comptana* as there are no green strawberry leaves upon which to feed during the winter, and if deprived of this winter feeding *A. floridana* dies.

Like *A. comptana* it does not pupate until spring and fresh specimens can be definitely differentiated by maculation, the basal patch in *A. floridana* is darker and larger and the question mark always found in *A. comptana* is absent in *A. floridana.*

At Whitesbog, N. J., strawberries and Uva-ursi are growing in close proximity. Both are heavily infested, the Uva-ursi nearly 100 percent, yet there is no evidence of cross breeding.

Heinrich, U. S. N. M. Bull. 123, 1923, p. 244, etc.
McDunnough Check List, Microlep. U. S. and Can., II, 1939, No. 7193.
Smith, N. J. Agri. Exp. Stat. Bull. 149, Feb. 27, 1901.
Zeller, Verh. Zool.-bot. Ges. Wien., XXV, 1875, p. 258.

(*To be continued*)

A Simple Method for Mounting Lepidoptera

By V. R. Damerell, Western Reserve University, Cleveland, Ohio

After experimenting for a number of years with many methods of mouting butterflies and moths the author has finally evolved one that appears to be simpler, and to require less handling of the specimen than others that he has tried. The method makes use of an insect pin sharpened at both ends. The relaxed insect, with closed wings, is grasped at the thorax with pliers, or with the fingers, and the pin is then accurately pushed through the under part of the thorax until it protrudes about a millimeter through the back. To expand the wings a pair of long nose

pliers are used, being opened between the wings so as to force them apart. At the same time the insect is put on its back on a grooved drying board, or one having glass plates, as in the figure, and the protruding end of the pin forced into the wood to hold the body in place. The wings are then expanded in the usual manner, using glass plates, paper strips, etc. When they are set the insect is removed and mounted by pushing the other sharpened end of the pin into the cork sheet of the mounting cabinet.

This method has a number of advantages. The pin is put through the insect once and left there. It is much easier to put it through from below than to attempt to push it in between the wings, or to push it in from below and then reverse it after the wings are set. Thus handling of the insect is at a minimum. The method permits setting the wings while the insect is on its back. This automatically prevents sagging of the abdomen and antennae, and overcomes the tendency of the wings to spring up in specimens which are difficult to relax. Finally, the point of the pin coming up from the back is almost invisible in the mounting cabinet, so that the insects appear more lifelike.

The one disadvantage is that in the mounting cabinet pins must be pushed into the cork layer by using pliers placed below the specimen, rather than pushing on the head of the pin. However, this method is generally advocated anyway as being least likely to injure the specimen.*

Notes and News in Entomology

Under this heading we present from time to time short reviews, notes, news, and comments on entomology throughout the world. Contributions from readers are solicited and will be acknowledged when used.

Recent events have stressed our lack of knowledge of many of the fundamental aspects of the study of insects. This is per-

* Spreading upside down can also be done without removing the head of the pin. One inserts the pin in the usual manner and then has Plasticene or other material soft enough to allow inserting the pin head in the groove of the mouting board. THE EDITORS.

haps especially true of insect physiology, and no branch of that field has been more neglected than the study of insect hormones. Entomologists have generally been content to take over and modify concepts developed in vertebrate physiology and in only a few instances, as in the case of the "gene hormones," has work with insects preceded that done with other animals.[11]

For some years it has been known that color changes,[11] moulting and metamorphosis [14] of insects are under the control of hormones. The brain was the first organ suggested as a source of an insect hormone.[7] More intensive work on small glands located close behind the brain in most insects, the corpora allata, turned the attention of workers to these interesting organs, but more recently the nervous system has been reconsidered.[12, 1] It has been suggested that the ventral glands and pericardial glands of *Dixippus* may have an endocrine function.[10] An as yet unverified report from Japan that the prothoracic glands of Lepidoptera are also a source of hormones,[6] together with work on the corpora cardiaca, will serve to show how little we know even about the morphology of the endocrine glands. It has been shown that the enigmatic ring gland of Diptera is the combined corpus allatum and corpora cardiaca,[5] but a more recent note from China is not quite in agreement with these results.[15] Something is known of the sequence of cytological changes in the neurosecretory cells of cockroaches,[12] but complex cytological changes in the corpora cardiaca, though observed, have yet to be carefully studied. Nothing is yet known regarding the chemical nature of insect hormones.

The classical endocrinological methods of extirpation and transplantation, in spite of the small size of insects, have yielded valuable results. An interesting series of papers by Vogt [13] has suggested that the ring gland plays a fundamental rôle in the maturation of the ovaries in *Drosophila*. If larval ovaries from one species are transplanted into the body cavity of another they will not develop unless a ring gland from the first species is transplanted simultaneously. Among vertebrates hormones have generally been thought to be non-specific, even between

Classes. But it appears that in *Drosophila* the hormone may actually be specific to the species. The relation between the development of larval salivary glands and ring gland secretion has been investigated by Bodenstein.[2] If larval salivary glands were transplanted into the body cavity of adult male *Drosophila,* they ceased to grow. If ring glands from the larvae were transplanted simultaneously, however, the salivary glands developed and finally underwent metamorphosis. The ring gland factor is in this case not species specific. In fact, specificity may be the exception, for the corpora cardiaca of the cockroach have been shown to contain comparatively large amounts of a hormone affecting the red chromatophores of the crayfish.[3] While extirpation of the ring gland of flies [4] and the corpus allatum of grasshoppers [9] prevents the development of eggs, it has been suggested that the action is not the result of a sex hormone, but through general metabolic processes.[4] There is nevertheless a close relationship between the ovaries and the corpora allata, as is shown by several reports of hypertrophy of the latter gland after castration.[4, 9] However, insects appear to live normally after the corpus allatum has been removed.

Another phenomenon formerly attributed to hormones is found in the development of castes of the primitive California termite, *Zootermopsis.* Light [8] has shown that if soldiers are removed, new soldiers develop from nymphs which would never had become nymphs if the original soldiers had been permitted to remain in the colony. Neoteinic reproductives develop after removal of the true king and/or queen. These observations, and others, suggest that a direct inhibitive action is exerted by these castes. While there is as yet no proof of the existence of "ectohormones" formerly invoked to explain this inhibition, an alternative explanation has yet to be found.

It will be seen from this brief review of a few recent developments that many significant biological principles may still be expected to be discovered as a result of studies in the field of insect hormones. M. F. Day.

[1] Bodenstein, Cold Spring Harbor Symposia on Quart. Biol. **10**: 17–26, 1942.
[2] Bodenstein, Biol. Bull., **84**: 13–33, 1943.
[3] Brown and Meglitsch, Biol. Bull., **79**: 409–418, 1940.
[4] Day, Biol. Bull., **84**: 127–140, 1943.
[5] Day, Ann. Ent. Soc. Amer., **36**: 1–10, 1943.
[6] Fukuda, Proc. Imp. Acad. Tokyo, **16**: 414–420, 1940.
[7] Kopec, Biol. Bull., **42**: 324–342, 1922.
[8] Light, Quart. Rev. Biol., **17**: 312–326, 1942; Univ. Calif. Publ. Zool., **43**: 413–454, 1944.
[9] Pfeiffer, Anat. Rec., **78**: 39, 1940; Anat. Rec., **81**: 57, 1940.
[10] Pflugfelder, Z. wiss. Zool., **149**: 477–512, 1937; ibid., **151**: 149–191, 1938; ibid., **153**: 108–135, 1940.
[11] Scharrer, Phys. Rev., **21**: 383–409, 1941.
[12] Scharrer, J. Comp. Neur., **74**: 93–108, 1941.
[13] Vogt, Biol. Zbl., **60**: 479–484, 1940; ibid., **61**: 148–158, 1941.
[14] Wigglesworth, J. Exp. Biol., **17**: 201–222, 1940; Naturwiss., **29**: 80–81, 1941.
[15] Zee and Pai, Amer. Nat., **78**: 472–477, 1944.

Types from the New England Museum of Natural History

The types of insects formerly at the New England Museum of Natural History (The Boston Society of Natural History) have been transferred to and are now part of the collections of the Museum of Comparative Zoology at Harvard College, Cambridge, Massachusetts. NATHAN BANKS.

THE GENUS CONOTRACHELUS DEJEAN (COLEOPTERA, CURCULIONIDAE) IN THE NORTH CENTRAL UNITED STATES. By Herbert F. Schoof. Illinois Biological Monographs. Vol. 19, No. 3, 170 pages including 9 plates with 109 figures.

While this monograph, which appeared in Dec. 1942, is confined to those species of *Conotrachelus* occurring in Illinois, Wisconsin, Iowa, Missouri, Kentucky and Indiana, because of the nature of some of the material presented and of the general distribution of the species treated in the eastern half of the United States, it will be of interest and use to a much wider field.

The author defines as his objectives: the preparation of workable keys to and the adequate descriptions of the species of the area under study, the study of the morphology of the male genitalia and the determination of their taxonomic significance, and finally the evaluation of the morphological characters used in the past and the indication of additional ones.

There is a review of the taxonomic literature followed by a chapter on materials and methods used including an account of the author's technique in the removal, study and preservation of the male genitalia.

The next chapter is devoted to a discussion of the morphological characters of taxonomic importance and is divided into four sections: 1. Body regions and their appendages; 2. Coloration and vestiture; 3. Characters for sex determination; 4. The male genitalia with a full discussion of the male genitalia of *C. nenuphar* (Hbst.) and the relative taxonomic value of the various parts.

In treating the genus four groups are designated with a key to these groups. Under each group there is a key to the species of the group. The external morphological structures and the male genitalia of each species is then described in detail, special characters being given as diagnostic. Each description is followed by a brief discussion of the distribution, biology, phylogeny or nomenclature of the species treated. Approximately two to five pages are devoted to each species. Twenty-eight species are covered, of which five are new.

A glossary, list of literature cited, nine excellent plates and an index conclude this well-organized and executed piece of work. E. J. F. MARX.

Current Entomological Literature

COMPILED BY THE EDITORIAL STAFF.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the current or preceding year unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

NOTE: The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the List of Journals given at the end of the literature. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL—**Bitancourt, A. A.**—Distribuicao teorica de lesoes em folhas ou frutas, causadas por insetos e outros animais ou por agentes infecciosos transmit idos por vetores. [14] 14: 243–52. 1943 [with English abst.]. **Bruner, Lawrence.**—Biographical note. [104] 12: 222–226, ill. **Burmeister, German.**—Biographical note. [104] 12: 159–65, ill. **Carpenter, G. D. H.**—Birds and butterflies. [31] 154 (3905): 304. **Chambers, V. H.**—British bees and windborne pollen. [31] 155: 145. **Dowdy, W. W.**—A preliminary report on the Arthropoda of the oak-hickory forest of Missouri with special reference to stratification (abst.). [Bull. Ecol. Soc. Amer.] 25 (3): 20. **Fisher, R. C.**—Woodboring insects in beech furniture. [31] 155: 116. **Flint, W. P.**—Obituary. [59] 37: 130–31, port. **da Fonseca, filho.**—Arthur Neiva. [15] 16 (2): 153–62. **Mello & Cuocolo.**—Alguns aspetos das relacoes do Habronema muscae (Carter, 1861) com a mosca domestica. [14] 14: 227–34, ill. 1943 [with English abst.]. **Metcalf, Z. P.**—The center of origin theory and its importance to ecology (abst.). [Bull. Ecol. Soc. Amer.] 25 (3): 19. **Miles, H. W.**—Wireworms and food production. [31] 155: 136–38. **Travassos, L.**—Atuacao cientifica de Arthur Neiva no campo da biologia. [111] 40 (1): i–vi, portrait. 1944.

ANATOMY, PHYSIOLOGY, MEDICAL—**Balch & Bird.**—Disease of the European spruce sawfly, Gilpinia hercyniae, and its place in natural control. [Sci. Agriculture] 25: 65–80. **Chapman, R. K.**—Interesting occurrence of Musca domestica larvae in infant bedding. [4] 76: 230–32. **Cook, E. F.**—Morphology of the larval heads of certain Culicidae. Morphology of the larval head of a sp. of Chironomus. [117] 9: 38–68, 69–77, ill. **Crombie, A. C.**—Sensillae of the adults and larvae of the beetle Rhizopertha dominica. [107] 19: 131–32. **Crowson, R. A.**—Further studies on the metendosternite in Coleoptera. [36] 94: 273–310, ill. **Fedotov, D. M.**—On the 2 types of

regress of organs in the ontogenesis of insects. [99] 44: 123–25. **Ferris, G. F.**—On certain evolutionary tendencies in the head of insects. [117] 9: 78–84, ill. **Ford, E. B.**—(See under Lepidoptera.) **Jackson, H. W.**—Method for observing and staining live insect blood under oil immersion. [Turtox News] 23: 12–14, ill. **Keene & Light.**—Results of feeding ether extracts of male supplementary reproductives to groups of nymphal termites. [Calif. Univ. Pub. Zool.] 49: 283–90. **Milne & Milne.**—Selection of colored lights by night-flying insects. [70] 24: 21–86. **Mohammed, A. H.**—Notes on the toxins of Egyptian scorpions. [Biochem. Jour.] 38: 284–85. **Oliver & Anderson.**—Effect of rematings on the fecundity of an infertile female. [90] 79: 89–94. **Thorpe, Crombie, Hill & Darrah.**—Food finding of wireworms (Agriotes spp.). [68] 155: 46–47. **Wellington, W. G.**—Effect of ground temperature inversions upon the flight-activity of Culex sp. [4] 76: 223. **Zee & Pai.**—Corpus allatum and corpus adiacum in Chironomus sp. [90] 78 (778): 472–77, ill.

ARACHNIDA AND MYRIOPODA—Baker, E. W.—Five mites of the family Ereynetidae from Mexico. [91] 35: 16–19, ill. (*). **Hoff, C. C.**—Notes on 3 pseudo-scorpions from Illinois. [59] 37: 123–28. **Hoffmann, A.**—Los ectoparasitos de los murcielagos Mexicanos. [Univ. Nac. Mexico, Fac. Cien. Dept. Biol.] 150 pp., ill. (*). Un nuevo acaro parasito de murcielagos. [112] 15: 185–89, ill. (S). **Mohammed, A. H.**—(See under Physiology.) **Stebbins, R. C.**—Lizards killed by a millipede. [119] 32: 777–78. **Williams, R. W.**—Bibliography pertaining to the mite fam. Trombidiidae. [119] 32: 699–712.

THE SMALLER ORDERS—Auguston, G. F.—Further report on a chigoe-like flea from California with a discussion of the true chigoe, Tunga penetrans. [38] 43: 119–21, ill. **Castle, G. B.**—Termites in Montana. [Northwest Sci.] 18: 64. **Klots, E. B.**—Notes on the Protodonata and Protozygoptera of the Lower Permian of Kansas. Gomphus consanguis. Notes on the Gomphinae with descr. of n. sps. (Odonata). [40] nos. 1258, 1259, 1260. **Lima, A. da C.**—Insetos do Brasil. IV. Panorpatos Suctorios, Neuropteros, Trichopteros. 141 pp., ill. **Sweetman, H. L.**—Ecology of the silverfish, Lepisma saccharina L., molting among the Thysanura (absts.). [Bull. Ecol. Soc. Amer.] 25 (3): 29.

ORTHOPTERA—Drake, Decker & Tauber.—Observations on oviposition and adult survival of some grasshoppers of economic importance. [81] 19: 207–23. **Piran, A. A.**—Catalogo sistematico y zoogeografico de Tettigonioideos Argentinos. [104] 12: 190–95. **Teale, E. Way.**—Insect appetite Number One [Mantis]. [Fauna] 6 (3): 73–76, ill. from photos. **Uvarov, B. P.**—New name in Acrididae. [108] 13: 144.

HEMIPTERA—Beamer, R. H.—New sp. of Dorydiella from Kansas (Cicadell). [103] 18: 48. **Bergamin, J.**—Metodos de laboratorio para observacao e criacao de Diatraea saccharalis (Fabricius, 1794) a broca da cana. [14] 14: 351–54, ill. 1943. **Caldwell, J. S.**—Notes on some less common gen. of tropical Cixiidae. [43] 44: 252–54 (*). **Hawboldt, L. S.**—History of spread of the beech scale, Cryptococcus fagi, an insect introduced into the maritime provinces. [Acadian Nat.] 1: 137–46, ill. **Knull, D. J.**—Descr. of 6 Typhlocybas from U. S. [43] 44: 269–72, ill. (*). **Knowlton, G. F.**—Observations on the feeding of some predacious hemiptera. [Proc. Utah Acad. Sci. A. & L.] 21: 57–59. **Lepage, H. S.**—A escama vermelha dos citrus em Sao Paulo, Aonidiella aurantii (Maskell) (Coccoidea). [14] 14: 311–30, ill. 1943 [very brief English abst.]. **Lepage & Giannotti.**—Notas coccidologicas (with English abst.). [14] 14: 331–50, ill. 1943. **Monte, O.**—Tingitideos americanos (S*). [14] 14: 263–72, ill. 1943. **Morrison, H.**—Mealy bug gen. Heterococcus and some of its relatives (Coccid). [91] 35: 38–55, ill. (*k). **Penner, L. R.**—Genus Laccocera (Delphac). [103] 18: 30–47, ill. (*). **Russell, L. M.**—New gen. and 12 n. sps. of Neotropical white flies (Heyrod). [91] 35: 55–65, ill. (*k). **Snow, W. E.**—Pictinus aurivillii. [59] 37: 129. **Trautman, M. A.**—Ovipositor studies of the leafhopper gen. Erythroneura (Cicadell). [43] 44: 265–68, ill. **Tuthill, L. D.**—Contributions to the knowledge of the Psyllidae of Mexico. [103] 18: 1–29, ill. (*k).

LEPIDOPTERA—Blevins, H. M.—Some butterflies of Sequoia Nat. Park. [38] 43: 122–23. **Bourquin, F.**—Metamorfosis de Perizoma impromissata (Geomet). [104] 12: 166–72, ill. **Carpenter, G. D. H.**—(See General.) **Chermock, F. H.**—Some new N. Amer. Lycaenidae. [4] 76: 213–16. **Comstock & Dammers.**—Brief notes on the early stages of 3 California moths. [38] 43: 113–18, ill.

Dethier, V. G.—Observations on the life history of Apamea velata. [4] 76: 223–25, ill. **Ford, E. B.**—Studies on the chemistry of pigments in the Lepidoptera, with reference to their bearing on systematics. 4. Classification of the Papilionidae. [36] 94: 201–23. **Hayward, K. J.**—Hesperoidea Argentina XIV. [104] 12: 173–80. **Sauer, H. F. G.**—Notas sobre a biologia de Ecpautheria hambletoni Schaus. (Arctiidae). [14] 14: 73–80, figs. 1943 [with English abst.]. **Trehan, K. N. & Bagal, S. R.**—Life-history and bionomics of potato tuber moth (Phthorimaea operculella Z., Gelechiidae). [Proc. Indian Acad. Sci.] 19 (5): 176–87, ill. **Venables, E. P.**—Identity of a borer attacking peach trees in the Okanagan Valley of Brit. Col. [4] 76: 232.

DIPTERA—Alexander, C. P.—New nearctic crane-flies. Part XXII. [4] 76: 217–22. New sp. of crane flies from the U. S. and Canada. [13] 36: 89–94. **Callan, E. McC.**—(See under Hymenoptera.) **Collin, J. E.**—Notes on some recent work on the Pipunculidae. [8] 81: 1–6. **Cook, E. F.**—(See under Anatomy.) **Correa & Ramos.**—Os anofelinos de Ilha de Santo Amaro. [94] 9: 9–16, ill. **Dickinson, W. E.**—Mosquitoes of Wisconsin. [Bull. Pub. Mus. Milwaukee] 8: 269–305, ill. **Goffe, E. R.**—Generic names of Meigen 1800 and the genotype of Zelima (Syrph). [8] 80: 284–86. **Hardy, D. E.**—New Asilidae and Mydaidae in the Snow collection. [4] 76: 226–30, ill. **Matheson, R.**—Mosquitoes of No. Amer. Their structure and habits: study and identification: how they carry disease: methods of control. 2d edition. 313 pp., ill. **Mello & Cuocolo.**—(See General.) **Smart, J.**—Notes on Simulidae II. [108] 13: 131–36 (*). **Vargas, L.**—Culicoides diabolicus en Mexico, caracteres del macho. [56] 5: 163–70, ill. **Zee & Pai.**—(See Anatomy.)

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